

1. **EPA Comment:** Pennsylvania Ambient Air Standards: The modeling analysis does not appear to address the Commonwealth's ambient air standards outlined in 25 PA code § 131.3. Pennsylvania has established ambient-air standards for settled particulate, beryllium, fluorides, and hydrogen sulfide.

**Response:** The proposed Installation Permit does not allow the Invenergy LLC Allegheny Energy Center Project to emit hydrogen sulfide. The proposed Installation Permit does allow the Invenergy LLC Allegheny Energy Center Project to emit 2.53E-5 tpy of beryllium in the total HAP project summary. This amount of beryllium is miniscule and would not likely exceed the Commonwealth's ambient air standards in 25 PA code § 131.3. The proposed Installation Permit does allow the Invenergy LLC Allegheny Energy Center Project to emit 4.24E-3 tpy of sulfur hexafluoride in the greenhouse gases project summary. This amount of sulfur hexafluoride is miniscule and would not likely exceed the Commonwealth's ambient air standards in 25 PA code § 131.3. The proposed Installation Permit does allow the Invenergy LLC Allegheny Energy Center Project to emit 44.59 tpy of filterable particulate matter (PM) and 44.24 tpy of condensable PM (for a total of 88.83 tpy of PM). Settled particulates (or "dustfall") from the Invenergy project are not expected to be a concern. Dustfall is generally associated with facilities that emit large portions of filterable PM, usually from material handling operations. A review of dustfall data measured throughout Allegheny County shows that only the dustfall locations in Natrona have exceeded the PA standards in recent years. These sites are located near ATI Specialty Rolled Products, a steel-making facility with several low-level, in-valley sources of filterable PM emissions. ATI has a proposed permitted limit of 575.50 tpy of total PM, which is considerably larger than the proposed Invenergy limit. Additionally, about half of the permitted PM emissions from the Invenergy project are condensable in nature, which is associated solely with the PM-2.5 fraction of PM and not larger filterable PM fractions that might contribute to dustfall. Emissions from Invenergy would also be at higher elevation than ATI (as well as most other facilities in Allegheny County), which should allow for better dispersion of PM than in other areas. Last, the most comparable facility in Allegheny County to the Invenergy project is the Springdale Energy Plant, a 514 MW power plant with combined-cycle natural gas turbines. While there is no dustfall site near the Springdale plant, former monitor sites for PM-10 and PM-2.5 in Springdale showed low concentrations in comparison to other sites in the county, and there have been no observations or complaints of dustfall in the vicinity of the Springdale plant.

2. **EPA Comment:** The Allegheny County Health Department (ACHD) should provide a more complete description of its AERMET preprocessing steps or direct reviewers to a more detailed description of the AERMET processing steps included in the documentation shared with EPA Region 3. An archive of electronic files used to develop the final model ready AERMOD meteorological files should be included in the final documentation. It would also be helpful if ACHD shared its QA/QC procedures to verify the wind measurements made at the Liberty monitor. This will ensure the wind fields were collected in accordance with EPA's on-site meteorological data collection recommendations.

**Response:** ACHD agrees with EPA's comment and has provided the requested information in the final documentation.

3. **EPA Comment:** Table 1 shows the hourly PM emission rates for the Invenergy AEC sources. The hourly emission rate for the PM-10 Class II 24-hr run does not match the auxiliary boiler emission

rates for the other 5 PM simulations; it is approximately 21% higher. PM emission rates for the other Invenenergy AEC sources are identical across the PM simulations. Please confirm if this is the proper emission rate for this source and if it is, why it is different than the other PM emission rates used for the auxiliary boiler in the other PM Simulations.

**Response:** The Auxiliary Boiler was modeled with the 0.016604361 g/s emission rate for both the PM-10 Class II 24-hr and the PM-10 Class II Annual PM simulations. This was the only source in Table 1 that had different values for PM-10 versus PM-2.5. The 0.016604361 g/s is the proper emission rate for PM-10 for the auxiliary boiler and 0.013730529 g/s was the proper emission rate for PM-2.5 for the auxiliary boiler. For the other four sources, the PM-10 and PM-2.5 were equivalent.

4. **EPA Comment:** It appears that some of the ancillary (intermittent) sources are contributing to the peak model concentrations in several of the SIL simulations. For CO, the emergency generator is accounting for the bulk of the modeled 1-hr and 8-hr peak values. For the 1-hr NO<sub>2</sub> SIL simulations, the auxiliary boiler appears to be contributing to the maximum modeled concentration (excluding the cold start emission scenario). For 24-hr (Class II) PM-10 and PM-2.5, the auxiliary boiler appears to account for the significant fraction of the maximum modeled concentrations. These sources are intermittent in nature. They are not intended to run on a continuous basis like the main combined-cycle combustion turbine and therefore are probably unlikely to be operating under worst-case meteorological conditions. Given this information, it is likely that many of the model concentrations in the SIL simulations far exceed what would occur under normal operating conditions (operations with just the main combined-cycle combustion unit operating and possibly the dew point heater).

**Response:** ACHD agrees with EPA's comment. No further analysis has been conducted for the modeled simulations.

5. **EPA Comment:** Modeled stack velocities for the emergency generator are approaching 50 m/s. Please confirm the stack velocity units used in the modeling analysis are in metric.

**Response:** ACHD reviewed the Invenenergy LLC Allegheny Energy Center Project Installation Permit Application, specifically Permit Application Form B Fuel Burning or Combustion Equipment, Part VII – Stack Data, and the exit velocity for the emergency generator is 152 ft/s. 152 ft/s is approximately 46.3296 m/s, and the emergency generator was modeled at 46.29 m/s.

6. **EPA Comment:** EPA Region 3 strongly recommends that Allegheny County address any modeling 1-hr NO<sub>2</sub> violation noted in its cumulative modeling analysis. We suggest consideration be given to the following modeling refinements that may reduce or eliminate the modeling violation. Model Refinement 1: Use more recently available 1-hr NO<sub>2</sub> background concentrations. Model Refinement 2: Reprocess the Meteorological Data to Utilize the Adjust u\* Option in AERMET. Model Refinement 3: Refine Modeling Hourly NO<sub>2</sub> Emissions from the Clairton Source Group. Model Refinement 4: If model 1-hr NO<sub>2</sub> violations persist, Allegheny County should consider utilizing a Tier 3 NO<sub>2</sub> option within AERMOD.

**Response:** ACHD agrees with EPA's comment. ACHD has re-run the cumulative modeling analysis with Refinement 2 above, which included the meteorological data reprocessed with the ADJ\_U\* option selected and with the most recent version of AERMET (v21112). The results showed no

receptor locations that were above the NO<sub>2</sub> NAAQS. The modeled results, as well as the reprocessed meteorological files, have been included with the final documentation.

7. **EPA Comment:** Allegheny County should consider updating its Modeled Emission Rates for Precursors (MERPs) analysis for the Invenergy AEC to account for EPA's updated guidance (DRAFT Guidance for Ozone and Fine Particulate Matter Permit Modeling, Feb. 10, 2020). EPA does not anticipate the overall outcome of the MERPs analysis to change but using more updated guidance could demonstrate the plant's impact on the secondary formation of O<sub>3</sub> or ozone and PM-2.5 is somewhat improved. ACHD analysis of the plant's impact on ozone values could be less significant using more recent (lower) design values, given these design values are not spuriously impacted by unusual weather conditions and/or mobile source emission changes due to COVID.

**Response:** The Permit Application used the MERPs values from U.S. EPA 2016 – “Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and PM<sub>2.5</sub> under the PSD Permitting Program”, U.S. Environmental Protection Agency Office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park, NC, December 2, 2016. At the time of the analysis, the MERPs from the guidance dated 12/2/16 was appropriate. ACHD did recalculate the MERPs analysis with U.S. EPA 2019 – “Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and PM<sub>2.5</sub> under the PSD Permitting Program”, U.S. Environmental Protection Agency Office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park, NC, April 30, 2019. The values from the Permit Application and ACHD's recalculated can be seen in ACHD's “Invenergy Modeling Review (Draft)” May 22, 2019. ACHD agrees that the overall outcome using the MERPs values from February 10, 2020 draft guidance would not significantly change the outcome.

8. **EPA Comment:** Allegheny County should consider the following points that would bolster its conclusion that the Invenergy AEC should not hamper the county's ability to meet and maintain the 2012 PM-2.5 NAAQS. These could be considered as ancillary supporting evidence in addition to Allegheny County's MERPs analysis for secondary PM-2.5 formation.

1) PM-2.5 impacts from NO<sub>x</sub> emissions, which form nitrates, are generally less important in Allegheny County than other PM-2.5 components. PM-2.5 speciation monitoring results reported by Allegheny County (PM-2.5 Speciation section of Allegheny County's 2019 Air Quality Annual Report) indicate recent nitrate levels are generally lower than sulfate, organic carbon, and elemental carbon components at its Liberty monitor. This monitor typically has the highest PM-2.5 design values in the county. We also note that nitrate levels are seasonal with higher concentrations occurring in the colder winter months. Seasonal contributions to local PM-2.5 levels would therefore be expected from AEC's NO<sub>x</sub> emissions. Allegheny County's recent PM-2.5 SIP revision includes speciation breakdowns of the Liberty monitor's urban excess. This analysis can be found in Appendix C (PM-2.5 Speciation Excess section of Appendix C to the *Attainment Demonstration for the Allegheny County, PA PM<sub>2.5</sub> Nonattainment Area, 2012 NAAQS*) of the county's most recent PM-2.5 SIP revision. Results from this analysis indicate nitrate levels in southern Allegheny County, near the Invenergy AEC project, are lesser contributors to local PM-2.5 concentrations. Allegheny County's analysis identifies sulfates, organic carbon, and elemental carbon as more important PM-2.5 speciation components near the Liberty monitor than nitrates.

2) Allegheny County has frequently described the impact of vertical atmospheric temperature inversions on local air quality in the Mon-Valley (The Art and Science of Forecasting Morning Temperature Inversions). Generally speaking, Allegheny County has described how these inversions “trap” emissions in Allegheny County’s river valleys contributing to elevated local pollution levels, mainly PM-2.5 and other particulate. It appears that the Invenergy AEC main combustion-turbine stack may be high enough to loft emissions such that they would not be overly impacted by local vertical temperature inversions. If Allegheny County can supply this supporting evidence, AEC’s emissions may not contribute to local PM-2.5 concentrations that are subject to these atmospheric phenomena.

3) Allegheny County’s recent PM-2.5 demonstration (Attainment Demonstration for the Allegheny County, PA PM<sub>2.5</sub> Nonattainment Area, 2012 NAAQS, September 2019) indicates the county will meet the NAAQS by its proposed attainment date (2021). Allegheny County may want to review its PM-2.5 SIP to determine if sources similar to Invenergy AEC were added to its projected (future) year emission inventory. Inclusion of an electric generating source(s) in the county or region that are similar or larger than Invenergy AEC would bolster the conclusion that the addition of the new power plant will not hamper future attainment of the PM-2.5 NAAQS since the PM-2.5 modeling demonstration showed compliance with new sources to Invenergy AEC in the area.

4) Invenergy AEC will be required to secure NO<sub>x</sub> emission off-sets before plant operations can begin since it is subject to Ozone Transport Region or OTR offset requirements. If emission reduction credits (ERCs) are secured from sources within Allegheny County, or very close to it, one could argue that these ERCs would help mitigate AEC’s future emission impacts on local PM-2.5 and Ozone concentrations in the county.

**Response:** With respect to point #1, ACHD agrees that NO<sub>x</sub> emissions have not been a contributor to localized excess PM-2.5 in Allegheny County, specifically in southern Allegheny County and at the Liberty monitor, which is the cause of the nonattainment issue in the county. Nitrate appears to be more regional in nature than other components of PM-2.5, with formation dependent on the presence of widespread NO<sub>x</sub> emissions rather than localized emissions. As noted in the comment, nitrates are also a seasonal component, existing mainly during colder months, when PM-2.5 concentrations can often be low. The Invenergy project should be expected to contribute minimally to nitrate formation in Allegheny County and surrounding counties.

With respect to point #2, ACHD agrees that the relatively high base elevation of the proposed Invenergy project (309.4 m) and the stack height of the main combustion/HRSG stack (54.9 m), along with buoyancy and flow from the stack, should allow for good dispersion of pollutant emissions. At a total release height of 364.3 m, the main stack would actually be one of the highest release points of emissions in the county (only about 35 m lower than the Cheswick power plant FGD stack height plus base elevation). ACHD and consultants have made visual observations that plumes at high release heights can often “pierce” through an inversion layer that traps pollutants, specifically in areas of complex river valley terrain. The release height of the Invenergy main stack would also be about 30 m above the total height of the Liberty PM-2.5 monitor to the northwest, which is the ACHD location with concentrations that are most affected by temperature inversions. Additionally, due to the distance of the proposed Invenergy project from other facilities such as U. S. Steel Clairton to the northwest and ArcelorMittal Monessen to the southwest, there should be little

possibility of plume merging from Invenergy with other source plumes that may be contributing to the accumulation of PM-2.5 in Allegheny County or the surrounding region.

With respect to point #3, the proposed Invenergy project was not included in the future case (2021) emissions inventory or modeled simulation for the PM-2.5 SIP, since the details of the project were not yet finalized at the time of the SIP development. A similar plant, the Tenaska Westmoreland Generating Station, a 940 MW combined-cycle natural gas power plant near Smithton in Westmoreland County, was included in the future case modeled simulation for the SIP. The future case modeled results showed no peaks of PM-2.5 near the plant, and did not affect future case design values at any site in Allegheny or Westmoreland Counties (see the PM2.5 SIP Appendix I.1, Air Quality Technical Support Document, Figures 3.2 and 3.3). Additionally, the Springdale Plant, as mentioned above as a comparable plant within Allegheny County, was included in both the base case (2011) and future case modeled simulations for the SIP and did not show modeled peaks of PM-2.5 near its location. The proposed Invenergy project is expected to have little impact on the attainment of PM-2.5 in Allegheny County and surrounding counties.

With respect to point #4, Invenergy AEC will be required to purchase ERC Offsets for 168 tons of NO<sub>x</sub>, 107 tons of VOC from stack emissions and 3.83E-2 tons of VOC from fugitive emissions. These values were calculated from offset ratios from Table 3-14 of the Permit Application. ACHD will encourage Invenergy AEC to purchase ERCs from facilities that are generally upwind of the Liberty monitor.